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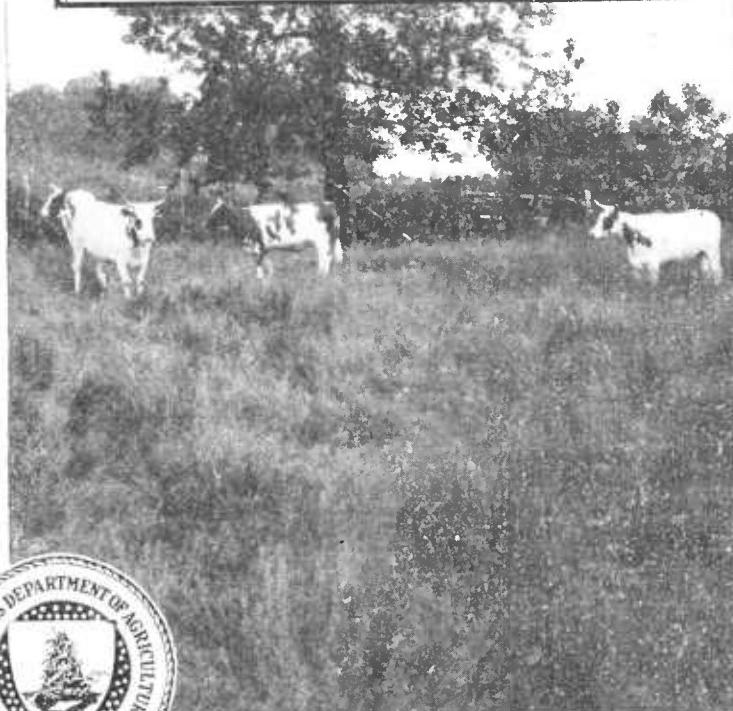
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U. S. Department of Agriculture

# U. S. DEPARTMENT OF AGRICULTURE

FARMERS' BULLETIN No. 1470

## CARE AND MANAGEMENT *of* DAIRY COWS



**A DAIRY HERD**, to be most profitable, should be well bred, properly fed, and carefully managed. These three points are largely dependent upon each other, and a herd of dairy cows will not give a maximum return unless all these essentials have proper attention.

Cows must be properly sheltered; the fresh cow and the dry cow need care suitable to their different conditions; cleanliness in various aspects is necessary; building up the herd to the best advantage requires definite policies; diseases must be guarded against; records must be kept; and expenses must be kept down.

In managing a dairy herd there are many practices which experience has shown to be good. A brief statement of some of these forms the content of this bulletin.

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# CARE AND MANAGEMENT OF DAIRY COWS

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## CONTENTS

Page		Page	
Building up the herd-----	1	Stable and yard-----	14
The dry cow-----	2	Cleanliness -----	19
The fresh cow-----	3	Feeding -----	22
Milking-----	6	Fitting for show-----	24
Keeping records-----	9	Diseases and common ailments-----	27

## BUILDING UP THE HERD

HERE ARE TWO METHODS of obtaining a high-producing herd of dairy cows. One method is to buy them, the other is to breed them. There are comparatively few men starting in the dairy business who can afford to purchase outright a high-producing herd. Although it is possible to buy good cows at reasonable prices in sections where there is a surplus of purebred or high-grade cattle for sale, it is only in exceptional cases that it is good business for a beginner to purchase a large number. As a rule the beginner is limited in funds, he does not understand the fundamentals of breeding and feeding, and in a majority of cases does not realize that high-producing cows must have better care and management than ordinary cattle.

It is usually better practice to start with a smaller number of cows and use a desirable purebred bull. These cows must be handled properly and the heifers selected from the best cows to build up the herd. After a time, when finances permit, one or two purebred females can be purchased as a foundation for a purebred herd. In the meantime considerable knowledge will have been gained in the care and management of dairy cattle, and the chance for financial loss will have been reduced to a minimum. This may seem like a slow method, but it is sure. It takes several years of intelligent effort and thought to build up and maintain a good herd of cows—either purebreds or grades—and the business can not be learned in a few months.

Several breeds of dairy cattle are being used in the United States and have proved satisfactory. There are good cows and poor cows in all breeds. For this reason, individual selection should receive as much attention as the breed.<sup>1</sup>

Breeds of dairy cattle should never be crossed. The present breeds of dairy cattle are the result of many years of intelligent breeding

<sup>1</sup> For information on breeds of dairy cattle, see Farmers' Bulletin 1443, U. S. Department of Agriculture.

along definite lines. By this method breeders have developed certain valuable characteristics which are transmitted when animals of the same breed are mated. When two animals of different breeds are crossed, the characteristics of both breeds are so mixed that they are not passed on to future generations with any degree of certainty.

A purebred sire should always be used. The bull is the sire of all the calves in a herd, therefore his influence will be multiplied a great many times faster than that of any one cow. The better the bull, the better the future herd will be.

Purebred cattle on the average produce more than grades. A tabulation of 17,405 yearly records of dairy-herd-improvement association cows, made by the Bureau of Dairy Industry, shows the relative production of purebreds and grades. Table 1 gives the results of this study.

TABLE 1.—*Comparative production of purebred and grade cows*

	Pure-bred	Grades
Number of records.....	2,919	14,486
Average pounds of milk.....	7,182	6,261
Average pounds of butterfat.....	288	258

The purebred cattle excelled the grades by almost 1,000 pounds of milk and 30 pounds of butterfat. All these cows were in cow-testing associations and probably received much the same care and management. However, purity of breeding does not always insure greater or more economical production. There are many herds of carefully selected grade cows that produce as well as or better than many purebreds of the same breed. Over 90 per cent of the dairy products of this country are produced by grade cows, and this will continue to be the case for many years to come. However, it is the blood of the purebred in our grade cows that makes them the high producers they are.

#### THE DRY COW

It is generally considered that a cow should be dry for a period before calving, for four principal reasons: (1) To give the organs concerned in milk secretion a rest; (2) to permit the nutrients of the feed to be used for the development of the fetus instead of for the production of milk; (3) to enable the cow to replenish any stores of minerals which may have become depleted through the production of milk; and (4) to permit the cow to build up a reserve of body tissue before calving.

#### LENGTH OF DRY PERIOD

That a cow should be dry for a certain period has been demonstrated to be sound economic practice. The proper length of the dry period seems to depend on the quantity of milk which the cow has produced and her condition as regards flesh. It is probable that the greater the yield of milk the greater is the depletion of the

stores of nutrients used in the secretion of milk and the longer the dry period required. Cows of low or medium production are not thought to require so long a dry period as high producers. Such cows should be dry a month or six weeks, provided they are in a good state of flesh. Thin cows may need a somewhat longer period. High producers may require two months or more to permit them to get in proper condition for calving.

#### FEEDING THE DRY COW

Cows normally lose flesh for three or four weeks after calving because they can not consume sufficient feed to provide adequately for both the milk flow and the maintenance of body weight. In order, therefore, that the cow may not become too thin after calving, it is necessary that she carry considerable flesh at time of parturition. It is well known also that cows in good condition at time of calving will start off the lactation period at a higher level of production than thin cows; this results in a larger yield of milk for the year. There is no economy in having a cow thin at calving time.

The feed during the dry period should be high in minerals, especially calcium (lime), since it has been shown by investigations at several experiment stations that this is the element most likely to be depleted. Good pasture in the summer and properly cured leguminous hay in the winter will supply this calcium. Considerable protein is required for the development of the fetus. For this reason and because most of the high-protein feeds such as the oil meals are likewise rich in phosphorus, which is used along with the calcium in storing up minerals in the animal body, the ration should contain considerable protein. The quantity of feed supplied should be sufficient to bring the cow to a proper state of flesh at calving time.

#### DRYING OFF

Most cows can be dried off by merely lessening gradually the frequency of milking. That is, first miss one milking, then miss two, then three, etc. When the daily production is only 6 or 8 pounds milking may be stopped entirely. The udder of the cow should then be let alone and nothing done to stimulate the secretion of milk. It is probably best after several days to draw out the milk that has accumulated, though the necessity for this has never been proved, as this milk will be absorbed in a short time. With persistent producers it is often necessary to reduce the allowance of feed, especially grain. With any cow the time required for drying off may be shortened by withholding a portion of the feed.

#### THE FRESH COW

##### CARE AT CALVING TIME

In handling dry cows that are heavy with calf care should be taken to prevent injury by slipping on stable floors or ice, by two or more cows crowding through doorways, and by pregnant cows mounting other cows that may be in heat. All cows in heat should be confined, or at least separated from the cows that are heavily

pregnant. In other particulars the pregnant cow can be handled like the rest of the herd.

A week or two before the cow is due to calve she should be kept under rather close observation, as she may need special attention when calving occurs. If the cow has been running on pasture, she may continue to do so; but her condition should be observed at least twice daily. If calving occurs during the winter, the cow should be placed in a clean, roomy, well-bedded box stall. Sometimes the udder becomes so large and swollen that it appears desirable to draw out some of the milk previous to calving; however, this is seldom necessary and should be avoided if possible, because it stimulates further secretion and because the first milk or colostrum is beneficial to the calf. The cow should be kept as quiet as possible and fed a laxative ration, wheat bran and linseed oil meal being especially desirable. The ration should not contain too much roughage, which on account of its bulk adds to the discomfort of the cow.

Immediately after the cow has calved it is a good practice to give her warm water to drink, and follow this with a warm bran mash, the idea being that if the cow becomes chilled at such a time the afterbirth may not be passed so readily, and the animal may be predisposed to other ailments. It is also thought best not to draw all the milk from the udder for a day or two after calving. This may help in the prevention of milk fever. After a couple of days, provided everything is proceeding normally, the calf may be removed and the cow placed in the stable with the milking herd. As much roughage may be allowed as the cow will consume, but the concentrates should be fed sparingly at first and gradually increased. With good producers not less than three weeks should be taken to get them up to full feed. The grain fed to poor or medium producers may reach the full quantity a little earlier. Too much concentrated feed at this time is likely to cause digestive disturbances and hinder the reduction of swelling in the udder. In general, it is better to err in not giving sufficient concentrates than in giving too much. The quantity to be given just after calving will depend upon the size of the cow, her production, and the condition of her udder; and will usually be from 4 to 7 pounds per day.

Cows should always be treated with kindness. No person fit to be a dairyman will treat them otherwise. The character of a person is shown by the way he handles cows and other livestock. Kindness pays in dollars and cents, but such incentive should not be necessary to obtain for the cow the treatment that is justly due her.

#### SEASON OF YEAR FOR FRESHENING

The influence of the season of freshening on the production of dairy cows has been the basis of considerable investigation. The Bureau of Dairy Industry has compiled some facts regarding the most profitable season for cows to freshen, and these are published in Department Bulletin 1071. The conclusions are based on a study of 10,870 yearly records in 64 dairy-herd-improvement associations, and are summarized in Table 2.

TABLE 2.—*Date of freshening, by seasons, with average yearly feed and production records, per cow*

Season	Number of cows	Milk production	Butterfat production	Cost of roughage	Cost of grain	Cost of feed	Income over cost of feed
Spring (March, April, and May).....	3,196	Pounds 5,842	Pounds 236	\$37.51	\$19.22	\$56.73	\$70.73
Summer (June, July, and August).....	1,328	5,941	236	37.62	22.48	60.10	66.59
Fall (September, October, and November).....	2,862	6,689	268	38.94	28.45	67.39	76.65
Winter (December, January, and February).....	3,484	6,439	258	37.65	25.51	63.16	75.66
Total and averages.....	10,870	6,269	252	37.95	24.06	62.01	73.36

Cows that freshened in the fall months ranked highest in average yearly production of milk and butterfat, in cost of feed, and in income over cost of feed; the cows that freshened in the winter months ranked second in these respects; on the average, those that calved in the spring and summer produced the least milk and butterfat and returned the smallest income over cost of feed.

The cost of feed was considerably higher for the winter-freshening cows than for the cows freshening in the summer months. This is no doubt owing to the fact that the former produced the most milk and therefore required the heaviest ration when the cost of feed was highest. However, in the feed cost per unit of milk there was little difference between the cows freshening in the different seasons.

The cost of roughage was found to be practically the same per cow for all seasons of freshening; but the grain cost was \$9.23 more for those freshening in the fall than for those which freshened in the spring. However, this increased feed cost was more than offset by the 32 pounds more butterfat produced by the fall-freshening cows.

Cows that calve in the spring usually give a big flow of milk during the summer months when feed is cheap. Butterfat is also usually low in price at that season. Then, too, the spring-freshening cow is very likely to receive a severe setback in milk production when the heat, flies, and short pasture appear. It is difficult to get her back to high production during the fall and winter; consequently she must be carried through the winter on expensive feeds with a very small margin of profit.

There are several advantages in having cows freshen in the fall. Butterfat usually brings a higher price during the fall and winter months. Labor is easier to obtain then, and there is more time to care for the calves and a large supply of milk. The fall-freshening cow, if properly fed and handled, will, as a rule, produce well during the winter months, falling off as spring opens. At this time the spring pasture grass will act as a stimulus and cause increased production during the spring and early summer. The period of low production will come during July and August, when conditions are extremely unfavorable for high production. It is undesirable to have cows freshen during the hot summer months, because of hot weather, flies, and dried-up pastures. Fall-dropped calves are easier to raise and usually less subject to diseases.

The dairyman who sells his milk to a city retail trade should have his cows freshen at all seasons of the year in order to keep up a steady, constant flow of milk. However, this point is not so important for dairymen who separate the milk, sell cream, and use the skim milk for feeding purposes.

#### MILKING

##### REGULARITY

Of all dairy operations, milking on most farms takes the most time and to many persons is the most irksome. It has commonly been assumed that cows should not only be milked regularly but that they should also be milked each time by the same man. Doubtless this has had much to do with many persons' distaste for dairy work.

Experiments at the Bureau of Dairy Industry experimental farm at Beltsville, Md., show that with average to good cows, milking may take place at irregular hours without any marked effect upon production. Whether very high producers would show similar results has not been determined. It was also found that when irregular milking was accompanied by irregular feeding the production was lessened about 5 per cent. Apparently cows are more sensitive to changes in the feeding routine than to variation in the hours of milking. The conclusion is not to be drawn from these experiments that regularity in doing the dairy work is a matter of little importance, but rather that cows can occasionally be milked earlier or later than usual if there is something else to which the dairyman desires to give his time.

Though it is generally believed that a cow will produce more when milked always by the same person, the practice in many large dairies where there are several milkers is to milk the cows as they come, rather than to reserve certain cows for each man. At the Beltsville station, 12 cows were divided into three groups of four cows each, and each group was milked regularly by the same man for 40 days. The 12 cows were then milked by the same three men in such a way that no cow was milked twice in succession by the same man. After 40 days the cows were changed to regular milking again for 40 days. The results show an increase of about 0.05 per cent in the milk and fat through steady milking by the same man. This is so little as to be almost negligible.

##### FREQUENCY

The oftener a cow is milked, within certain limits, the greater the production. This accounts for the fact that many cows on test for the advanced registry or register of merit are milked oftener than is the practice with the ordinary herd. The increase that may be expected by milking three times a day instead of twice has not yet been definitely determined. While some estimate the increase as high as 25 per cent, experiments at Beltsville show the average increase in the yield of good cows for short periods (40 days) to be about 12 per cent. Preliminary figures also show the increase for long periods (one year) to be about 18 per cent. The cows milked three times a day were more persistent in their yield of milk than those milked twice a day.

The amount of increase due to more frequent milking seems to be dependent upon the quantity of production and the capacity of the udder. When the udder becomes much distended, milk secretion is checked, and if the production and udder capacity are such that this occurs on twice a day milking, a greater percentage increase may be obtained by milking three times than would be obtained by an extra milking of cows with larger udders. Similar experiments comparing three and four times a day milking for short periods show an increase of slightly over 6 per cent by milking four times.

In a few dairies all the cows are milked three times a day; in a few others only some of the higher producers are milked three times a day. The economy of milking more than twice a day is a matter which must be figured out by the individual dairyman from the actual cost of the extra milking and the value of the product, bear-

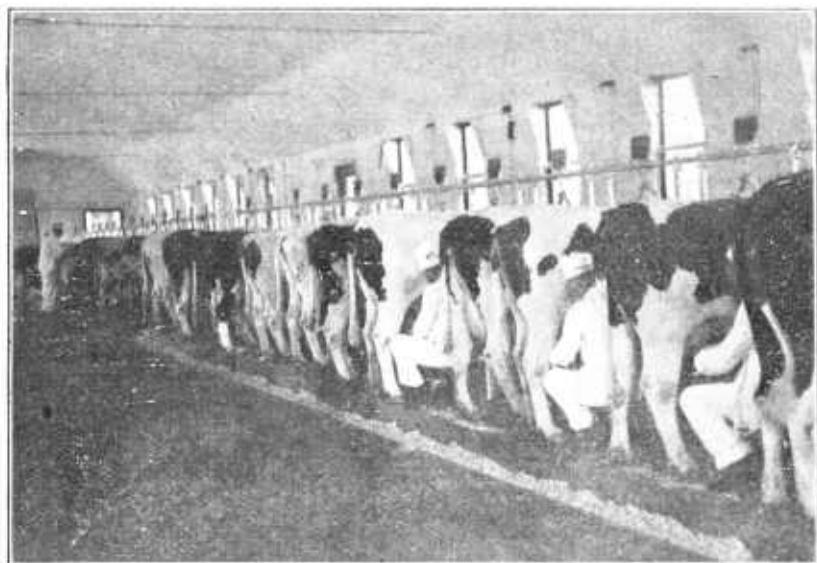


FIG. 1.—Milking by hand

ing in mind that approximately 1 pound more of concentrated feed will be required for each 2 or 3 pounds of extra milk produced. In the absence of more extended experimental data, one can safely estimate the increase in production for short periods, from milking three times a day, as 12 per cent more than the production from milking twice a day; and the increase by milking four times, as 6 or 7 per cent over milking three times a day. One can also estimate the increase from milking three times instead of twice, for long periods, at 18 per cent.

#### MILKING BY HAND

Proper hand milking (fig. 1) should have for its objects, aside from sanitation, to draw the milk with the least discomfort to the cow, to draw it as quickly as possible, and to get all the milk. Some milkers, through unnecessary roughness, an unusually strong grip,

or long finger nails, keep the cow uneasy during milking. This may lead to kicking. There is no advantage in slow milking, and experiments at the Wisconsin station<sup>2</sup> showed that the percentage of fat may be lowered by prolonging the milking operation.

Unless all the milk is removed from the udder, it is thought that the milk remaining will interfere with the functioning of the gland and result in a diminished production. When the calf runs with the cow, probably this is the way in which nature adjusts the supply to meet the demand. In order to get all the milk certain manipulations of the udder have been practiced. These manipulations apparently increase the production slightly, but they have never come into general use, although an abbreviated modification of the method is practical. An upward pressure on each quarter of the udder for



FIG. 2.—A mechanical milker

a few times when milking is nearly completed will help to bring the milk into the teats where it can be drawn.

#### THE MECHANICAL MILKER

The mechanical milker (fig. 2) is a success on many dairy farms. It saves labor, is easier, and to many persons its operation is more agreeable than hand milking. The cost of installation and the labor of keeping the machines in proper sanitary condition make them impractical if the herds are very small.

It is possible to have milk with a low bacteria count when machine drawn by giving proper attention to cleansing and sterilizing. In many instances, however, just as with cream separators,

<sup>2</sup> Sixth annual report.

this matter has been neglected or carelessly done. Theoretically, machine-drawn milk should be cleaner than that drawn by hand, because it is better protected from contamination by the cow, the milker, and the stable air.

So far as quantity of production is concerned, the mechanical milker seems to give as good results as ordinary hand milking. It is the general practice for a hand milker to follow the machine to see that the milking is completely done and to draw any milk that is left.

It has been claimed that machine milking causes udder troubles, and with the earlier models there was doubtless some ground for such a claim, especially if they were left on the teats too long. More recent makes and styles, which are constructed so as not to interfere with the circulation of blood through the teats, are thought to lessen the likelihood of such trouble. Failures with the mechanical milker can usually be traced to a lack of mechanical knowledge on the part of the operator, carelessness of operation, or lack of attention to proper cleaning of the machine. The increased use of the milking machine indicates its practicability.

#### KEEPING RECORDS

In order properly to manage a herd of dairy cows, it is necessary to keep records. The system need not be elaborate, but should be sufficient to furnish accurate information on milk and butterfat production of individual animals and quantity of feed consumed. In addition, breeding dates should be recorded and a plan of identification and registration of the purebred animals should be followed. One should not rely on memory for such records, but should put every item down in writing in such a manner that it can be easily referred to when need arises. Whatever system is adopted should be continued. The records should not be allowed to lapse.

#### PRODUCTION RECORDS

The principal reason for keeping milk-production records is to show definitely which cows are profitable and which are not. The inferior cows can then be disposed of and the better ones kept for production and breeding purposes.

Another important reason for keeping daily records is that they furnish information which is used as a basis for feeding. Cows should be fed according to the quantity of milk or butterfat produced, and the daily production must be known. Sickness or other abnormal conditions are generally accompanied and often preceded by a decline in milk production. This decline can easily be noticed if the practice of weighing and recording the milk daily is followed.

A spring-balance scales is necessary. (See fig. 3.) These scales are equipped with adjustable hands, one of which is set at zero when an empty pail is hung on the scale. The quantity of milk then may be read without subtracting the weight of the bucket. The milk scales should be graduated to tenths of a pound. If milk pails of different sizes are used by the milkers, it is a good idea to keep a weigh pail at the scales to avoid confusion. The scales should be hung in a convenient place in the barn or milk room.

A suitable sheet for recording the daily weight should be placed in a clean, protected place near the scales. These sheets may be so arranged (fig. 4) that spaces are provided for writing the name or number of the cow and spaces for recording the weights of the milk both morning and evening. Some use sheets with spaces for seven days only, but the more common way is to have spaces for the entire month. Scales and milk sheets can be obtained from dairy supply houses. Many publishers of dairy periodicals also distribute milk sheets for a nominal price.

At regular intervals samples of milk from individual animals should be tested for butterfat.<sup>3</sup> A common practice is to take a composite sample of milk from each cow for three consecutive days,

about the middle of each month, and test this for butterfat. The butterfat percentage thus obtained is used as the average test for the month and the monthly butterfat production is computed from this.

There are other methods that can be used, such as weighing and testing the milk for one day during the month. The total yearly production for each cow, as shown by such tests, will be close enough to actual production for practical purposes. In some cases the milk is weighed and tested one day every two or three months. This method is not so accurate, but it is better than no test at all.

In many sections of the country dairy-herd-improvement associations are in operation. If a dairyman is a member of a dairy-herd-improvement association, the detailed production records of his cows are kept by the tester, who is hired by the association (fig. 5).

The tester visits each member's herd one day out of each month, weighs and tests the milk of individual cows for that day, weighs the feed, and figures the total quantity of milk and butterfat given and the feed consumed for the month. This system has proved to be an inexpensive and reliable method of keeping herd-production records for a number of dairymen in a community.<sup>4</sup>

#### BREEDING RECORDS

A record should be made of date of breeding, the bull to which bred, and date of expected calving. The gestation period for cows is approximately 280 days. For convenience it is well to have a gestation table handy for reference in estimating date of calving.

<sup>3</sup> For directions on testing milk, see Chemical Testing of Milk and Cream, U. S. Department of Agriculture, A. 12.

<sup>4</sup> For further information concerning dairy-herd-improvement associations, see Farmers' Bulletin 1604, Dairy-Herd-Improvement Associations, and Stories the Records Tell.

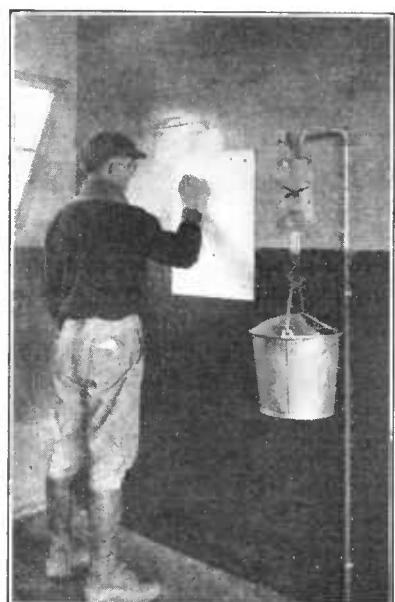


FIG. 3.—Weighing and recording the milk

UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF DAIRY INDUSTRY		182	
DAILY MILK AND FEED RECORD FOR MONTH OF _____, State, _____, Post Office, _____.		Owner of herd, _____.	
NAME NUMBER.		REMARKS.	
A.M.			
1 P.M.			
2 A.M.			
3 P.M.			
4 A.M.			
5 P.M.			
6 A.M.			
7 P.M.			
8 A.M.			
9 P.M.			
Total production,			
Tallow and other fats,			
Total butterfat, %,			
Total milk solids, %,			
Yield after cream,			
Total solid products,			
Lard,			
Butter,			
Cheese,			
Whey,			
TOTAL AMOUNT OF DAIRY COW FEED			
DAIRY COW FEED			

FIG. 4.—Sheet for recording daily milk weights

If a gestation table is not available, count back three months from date of breeding and add 10 days. For example, if a cow is bred on March 10, by counting back three months and adding 10 days, the probable date of calving is found to be December 20. It is well to have this record in a small pocket-size notebook that can be carried in the work clothes. Most of the national dairy-breed associations distribute record books and blanks of this kind. Such books are especially helpful where the herd includes purebreds.

#### REGISTRATION AND IDENTIFICATION

A good plan is to assign a number and name to each animal in the herd. If a calf is dropped, or a new animal is added to the herd, it should likewise be assigned a number. Many breeders use fiber-disk ear tags on which the herd number is stamped. These



FIG. 5.—The tester tests the milk for percentage of butterfat

tags are about the size of a quarter and are durable. They are attached to the ear with an ordinary hog ringer and if put on properly are not easily torn out. Then, too, they are not easily confused with the small metal tag that is placed in the ears for identification in tuberculin testing (fig. 6).

A strap around the neck, to which is attached a metal tag with a number on it, is also used. The strap will last for several years and there is little likelihood of its being lost. However, straps are somewhat more expensive than fiber ear tags. The practice of slitting the ears for identification is not recommended. It is not only a cruel practice but also gives the animal a bad appearance.

Tattooing numbers in the ears is practiced by some breeders and is required by some breed associations for identification purposes in connection with advanced register testing. There are tattooing out-

fits on the market for doing this work. If the tattooing is properly done, it is reliable and will last for the lifetime of the animal. However, the tattoo marks do not show up distinctly on animals having dark skins. Even on light skins the tattoo numbers are often difficult to make out, and it becomes necessary to catch and hold the animal in order to see the numbers.

A diagram of each animal can be drawn on loose-leaf forms provided by the various breed associations. On the opposite side of this sheet is usually a three or four generation blank pedigree. Forms of this kind filled out for each animal in the herd and kept in a

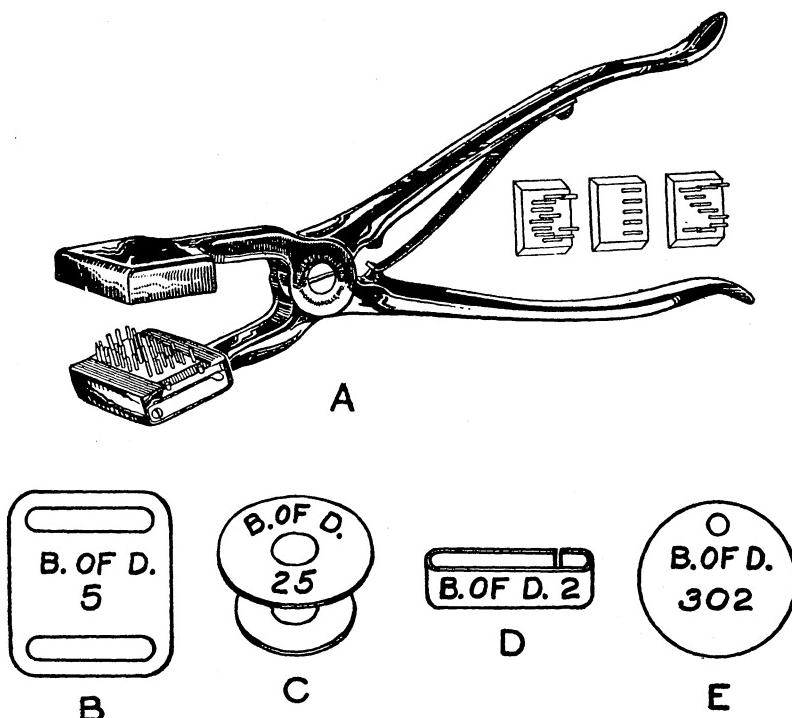


FIG. 6.—Methods of marking cattle: A, tattooing outfit; B, metal bag to go on strap around neck; C and D, metal tags; E, fiber disk ear tag

holder will be of great help to the owner, especially if he has purebreds.

Registration papers on all purebred animals should be on hand. Calves should be registered as soon as practicable. The various national dairy-breed associations furnish directions and advice for registration. Their names and addresses are as follows:

- American Guernsey Cattle Club, Peterboro, N. H.
- American Jersey Cattle Club, 324 West Twenty-third Street, New York, N. Y.
- Ayrshire Breeders' Association, Brandon, Vt.
- Brown Swiss Cattle Breeders' Association, Beloit, Wis.
- Dutch Belted Cattle Association of America, Rockville, Conn.
- Holstein-Friesian Association of America, Brattleboro, Vt.

In addition to the dairy-cattle names above, some breeds primarily developed for beef production are occasionally bred and used as dairy cattle. Their associations are as follows:

American Devon Cattle Club, 51 Cornhill, Boston, Mass.

American Shorthorn Breeders' Association, 13 Dexter Park Avenue, Stock Yards, Chicago, Ill.

Milking Shorthorn Society, Independence, Iowa.

Red Polled Cattle Club of America, Richland Center, Wis.

#### ADVANCED REGISTER TESTING

The various national breed associations for dairy cattle have established advanced-register classes for purebred cows. Animals are entitled to entry in these classes when their production has reached a certain standard set by the association. Such tests are usually con-



FIG. 7.—A one-story barn with milk room connected by covered passage

ducted by representatives of the State agricultural colleges or experiment stations. Rules and regulations for conducting these tests differ according to the breed and the kind of test undertaken. Information can be obtained by writing the breed associations or the State agricultural experiment stations.

#### STABLE AND YARD

The main essentials in housing dairy cows in the winter seem to be to keep them dry and out of the wind and drafts and to provide plenty of fresh air and sunlight. Apparently the matter of temperature in itself is not a vital consideration, except perhaps in the most severe portions of the United States. It has been noted at the Beltsville station (in Maryland) that cows do their best in the coldest weather and their poorest during the hot summer months.

Probably there is no advantage in keeping the stable temperature much above freezing, and there may be a disadvantage if the temperature rises above 60° F.

#### TYPES OF BARN

Types of barns which can be made suitable for dairy cows are the basement barn, one-story stable, two-story barn, round barn, and open shed or covered barnyard (figs. 7, 8, 9, and 10).

In the basement barn the cows usually are housed on the lower floor. Owing to the greater protection from the weather afforded by such a barn, it is likely to be warmer than other types in the winter, and it is probably for this reason that more such barns are to be found in the North than in the South. Many basement barns may be criticized for lack of sufficient light and for being so low that the slope away from the stable is not enough to afford proper drainage of the cow yards. The ventilation and lighting of such

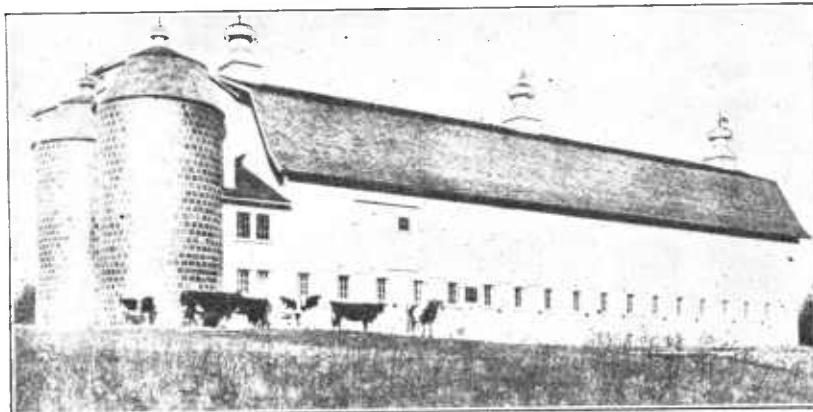


FIG. 8.—A two-story barn. Note space for hay storage

barns is generally poorer than that of other types, but they can be remodeled so as to be satisfactory in these respects.<sup>5</sup>

The one-story and two-story barns (figs. 7 and 8) can be well lighted and ventilated and can be kept in a sanitary condition more easily than a basement barn. However, with a one-story barn other facilities must be provided for the storage of hay. For this reason the expense of housing both cows and feed will in most cases be greater with the one-story than with the two-story barn in which the same roof covers both the cows and the feed. The fire hazard is usually greater in the two-story barn.

In the round barn (fig. 9) more space can be inclosed with the same amount of building material than in other types, and it appears that this is the chief advantage which may be claimed for it. The practice of locating the silo in the center of the barn may put the silage in the most convenient place for feeding, but it is likely to

<sup>5</sup> For information on barn construction, see Farmers' Bulletin 1342.

fill the stable with odors which may taint the milk; and certainly a silo so located is not so easily filled as one outside the barn.

#### OPEN SHED OR COVERED BARNYARD

The open shed or covered barnyard (fig. 10) is a practical method of housing dairy cows. It provides the best known method of saving and preserving all the fertilizing constituents of the manure; it permits the feeding under shelter of rough materials such as cornstalks and makes possible their utilization for bedding; when there is plenty of bedding, cows so housed keep cleaner than those confined in stanchions. These are the principal points in favor of the open-shed system.

In an experiment at the Beltsville station it was found that the cows in the open shed produced a little more milk, but at a greater



FIG. 9.—Arrangement of equipment in a round barn

cost for feed, than the cows in the closed barn. The more timid cows were fought away from the feed racks in the shed, which resulted in a much lower production from such cows. Probably it would be a matter of economy to confine the cows at feeding time. Cows so housed should be dehorned.

The labor required under the two systems was slightly greater with the open shed. Had the cows been milked in the open shed this would not have been the case, but since this practice is not recommended in the production of market milk, the cows in this experiment were taken to a separate stable for milking. Sixty-eight per cent more bedding was used in the open shed.

#### STALL EQUIPMENT

Of the various methods of confining cows, the swinging stanchion (fig. 11), which allows considerable freedom, has met with the

greatest popular approval. The old-fashioned rigid stanchion is being replaced with this more humane device. But even the swinging stanchion fails to allow enough freedom to meet the desires of many dairymen who are trying to get maximum production regardless of expense. These dairymen use box stalls.

By confining in stanchions less space is required, the labor of feeding, milking, and cleaning the stable is materially lessened, and the bedding needed is only one-fourth to one-third as much as box stalls require. However, cows so confined are more liable to have their teats injured by being stepped on, either by themselves or by other cows. In experiments at the Beltsville station in which 12 cows were kept in box stalls and stanchions in alternate periods, it was found that the cows in box stalls produced less than 4 per



FIG. 10.—An open shed for housing dairy cows. The roughage is fed in this shed. Grain is fed in the milking barn.

cent more milk than those kept in stanchions. The increase was not enough to pay for the extra labor and bedding required.

Dirt floors should not be used in a dairy stable. They are insanitary, they can not be flushed, and holes soon appear. A stable floor should be durable and easy to keep clean. Concrete should be neither so smooth as to be slippery nor so rough as to make thorough cleaning difficult.<sup>6</sup>

#### PAINT AND WHITEWASH

If the inside of the cow stable is to be painted, the woodwork or plastering should be as smooth as possible to avoid the use of excessive quantities of paint. If it is to be whitewashed a rough surface is preferable, as whitewash will not adhere so well to smooth

<sup>6</sup>The construction of various kinds of floors, as well as ventilating and lighting, is discussed in Farmers' Bulletin 1342, *Dairy Barn Construction*.

surfaces. White paint made of white lead and linseed oil when used in the cow stable will turn yellow. If the cow stable is to be painted white, therefore, it is better to use some kind of paint which does not contain linseed oil. If the stable is painted gray or some color other than white, the change in color will not be so noticeable. In such cases linseed-oil paint can be used more advantageously.

Cow stables are usually whitewashed once or twice a year. There are many whitewash formulas which call for the addition to the lime and water of other substances, such as salt or skim milk. Just how much advantage there is in adding such materials is a matter of conjecture. Satisfactory whitewash can be made by the use of only lime and water. The ordinary hydrated lime when mixed with water makes a good whitewash; or the quicklime ordinarily

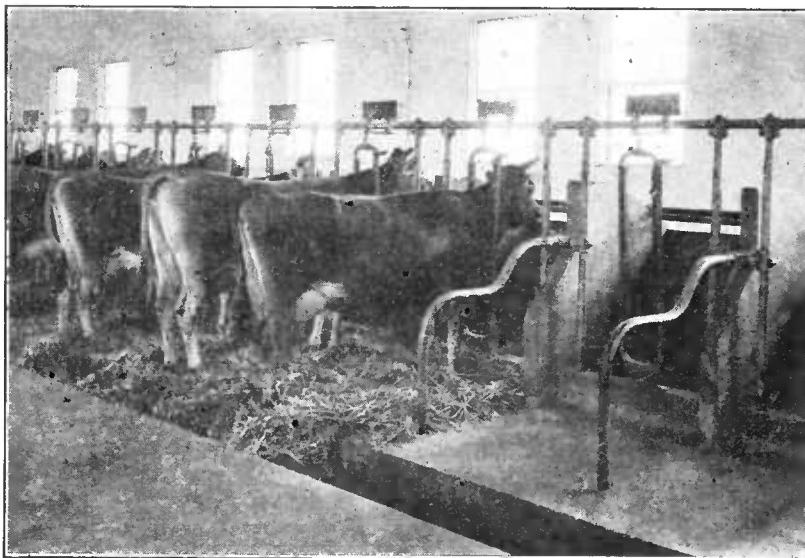


FIG. 11.—Interior of a modern dairy barn. Note the swinging stanchions, concrete floor, and gutter. The mangers are designed for experimental feeding

called lump lime may be slacked with a minimum quantity of water and this used in place of the commercially prepared hydrate of lime. Only freshly burned lump lime should be used, and any that is air-slacked should be discarded, as whitewash made from such lime will not stick.

Whitewash may be applied with a brush (fig. 12) or with a spray pump. It can be applied more heavily with a brush, and sometimes one coat will give as good results as two with the sprayer. Spraying, of course, is quicker, but smears up the floor and equipment more than the brush method. But no matter what method of application is used, it will save time in cleaning if the equipment is covered with old bags or similar material. If the floor is kept wet while the whitewashing is in progress, the whitewash that is dropped will not stick so tight but that it can be dislodged readily with water and a brush or broom.

**EXERCISE**

Exercising cows by making them walk 3 miles a day was found at the Beltsville station to cause a greater feed consumption and a slightly higher percentage of fat in the milk, but the quantity of milk remained about the same. The extra feed consumed cost more than the increased quantity of fat was worth. So far as production is concerned, a cow needs no more exercise than she will get by walking at will about a small yard. The writers know of no experiment on the influence of exercise upon the health that has been conducted over a long enough period to warrant any conclusions regarding it.



FIG. 12.—Whitewashing an old barn

It is thought good practice to let the cows out of the stable at least once a day, even if this is not necessary for the purpose of watering. The stables are more easily cleaned and bedded when the cows are out, and opportunity is afforded for convenient observation of any cows that may be in heat.

**CLEANLINESS****GROOMING**

No dairyman should permit his cows to remain in a dirty condition. Pride in his stock and stable should be sufficient incentive to keep his cows and stable clean. Manure or litter should not be allowed to remain on the cows, and for this reason grooming should

be a part of the regular dairy work. Grooming not only adds to the appearance of cows by keeping them clean and improving the condition of their coats, but also makes possible the production of cleaner milk. Washing and carding the tails occasionally adds much to the appearance of the herd.

#### BEDDING

Bedding is used for three reasons: (1) To provide a comfortable bed, (2) to keep the cow clean, and (3) to absorb the liquid manure. The common bedding materials are wheat straw, oat straw, corn stover, shavings, and sawdust. The desirable qualities of a bedding material are bulkiness, large water-holding capacity, high content of fertilizing constituents, and freedom from dust which would

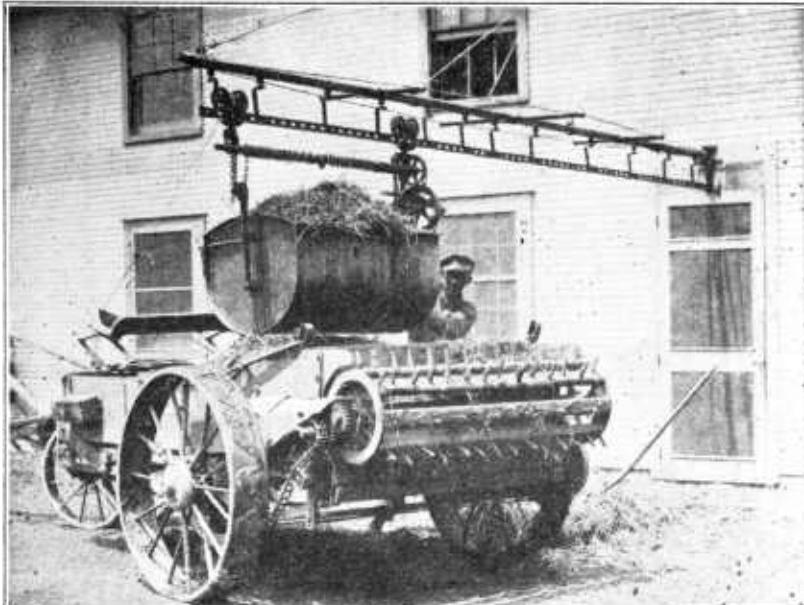


FIG. 13.—Placing manure from the barn in spreader

contaminate the milk. As regards bulkiness, the straws and shredded corn stover are superior to shavings or sawdust. Experiments at the Illinois station show that 40 per cent more shavings than oat straw are required to keep the animals bedded.

The water-holding capacity of various materials was determined at the Illinois station and verified by work at the Beltsville station. With dry materials they rank as follows: Shredded or cut corn stover, straw, with little choice between shavings and sawdust for last place.

The fertilizing value is greatest with the corn stover. This is followed by oat straw and wheat straw in the order named. Sawdust and shavings have only a slight fertilizing value.

Shavings are superior to other forms of bedding as regards cleanliness and for this reason are much used in dairies where very clean

milk is produced. In dairies where this extra sanitation is not a matter of great importance, it appears that pound for pound shredded stover or straw is worth at least 50 per cent more than sawdust or shavings. Records at the Beltsville station show that when wheat straw is used as the bedding material, about 4 pounds per cow per day will be used by cows confined in stanchions, and about 14 pounds will be used by cows in box stalls. Although 4 pounds a day will provide a suitable bed and keep the cows clean when confined in stanchions, this quantity is not sufficient to absorb all the liquid manure; to do this, about 8 pounds per cow would be required for an average producing herd.

#### MANURE DISPOSAL

The advice generally given for handling manure on the dairy farm is to spread it on the land as soon as possible after it is made (fig. 13). With certain reservations this seems to be sound advice. It is questionable whether one obtains greater returns from the manure handled in this way during the winter than by proper

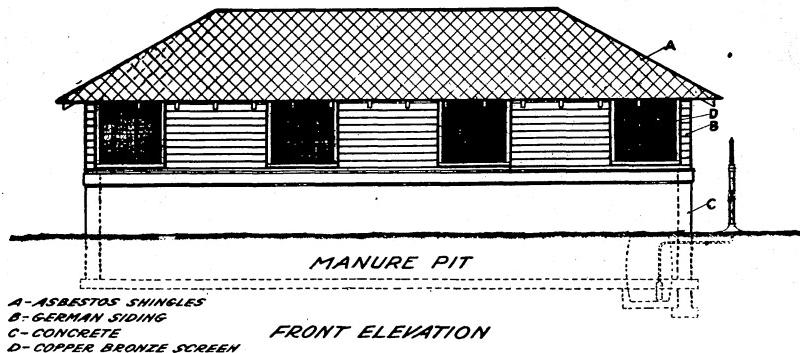


FIG. 14.—A concrete manure pit

storage, but it does give better distribution to farm labor and obviates the necessity of a building to hold large quantities of manure. Spreading manure on snow, though often advised, is a questionable practice on account of washing, especially if the land is rolling. Probably it is also inadvisable to haul manure on the fields when the ground is so soft that the wagon makes deep ruts.

At certain other seasons, when farm work is pressing, manure hauling must be delayed. It appears, therefore, that storage of manure can not well be entirely avoided, and a suitable storage place should be provided to prevent excessive loss of fertilizing ingredients through leaching (fig. 14). In storing manure plenty of moisture and thorough packing are the main things to consider. Where bedding is cheap, sufficient can be used to absorb the liquid manure; where it is scarce and high in price, the liquid can be drained into a cistern, or by using a water-tight manure pit the liquid can be stored with the solid manure. All manure should be removed from the stable at least once a day.

The equipment used in removing manure ranges from a wheelbarrow to a power conveyor running in the gutter behind the cows.

In dairies of medium to large size the most popular method of removing manure is the litter carrier with overhead track, such as is manufactured by several barn-equipment firms. The carrier may discharge directly into a manure spreader or wagon or may go to a manure pit. Inclosing or screening the manure pit will help in controlling the fly nuisance.

#### FEEDING

##### METHOD AND ORDER OF FEEDING

The quantities of grain to be fed should be determined for each individual cow wherever possible. A general herd mixture can be made up and proper quantities weighed out to each cow. A number of methods for feeding the grain are in use, but the most practical is

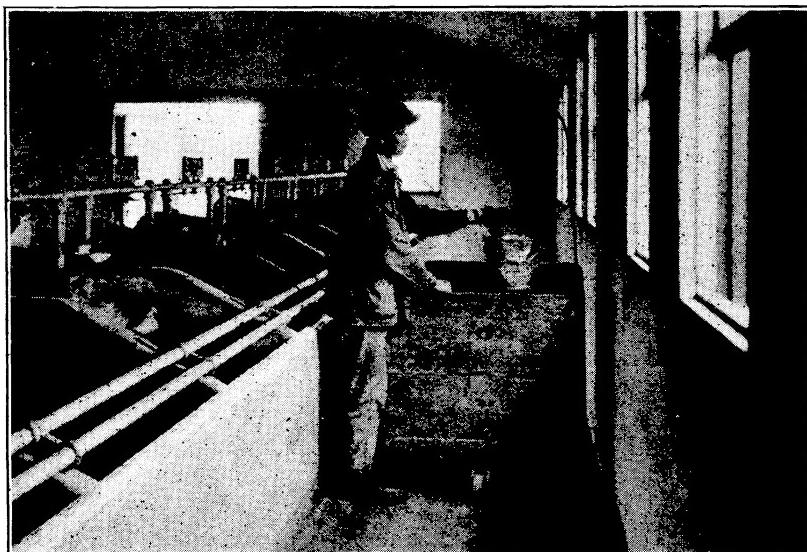


FIG. 15.—Feeding from a truck. These cows are on experiment, and the high mangers keep them from getting feed from adjacent cows

to place a sufficient quantity in a truck or cart that is pushed through the feeding alley, where the quantity for each animal is weighed or measured out. (Fig. 15.) If this method is used, there may be certain cows that will need some feed not in the general herd mixture, and these can easily be fed later. There should be a feeding card or sheet available showing the quantity of feed each cow is to get. A small blackboard can be attached to the feed cart and the figures placed on this board with chalk every two or three days. A spring balance scale suspended above the cart on an arm will be of great help.

Silage can be fed from the same or a similar cart. If a scoopful of silage is weighed occasionally as a check, the quantity can be measured with a fair degree of accuracy.

Baled hay is convenient for feeding. If loose hay is fed, the hay chutes should be conveniently placed so as to require as little

work as possible. The allowance of hay should also be weighed occasionally.

Feeding should be done regularly, because, as has already been pointed out, cows are probably more sensitive to change in the feeding routine than to variation in the hours of milking. Grain is usually fed first, leaving the roughage until after milking. This practice will tend to keep down the dust and dirt during milking. Silage and other feeds that might taint the milk should be fed after milking. About half the grain and roughage should be fed in the morning and half in the evening. If cows are milked oftener than twice a day, the grain feedings should correspond, but the roughage can be fed twice a day. Some dairymen feed grain on the silage.

#### WATER

A plentiful supply of fresh, clean water is essential on the dairy farm. (Fig. 16.) The demand for water by the dairy cow depends



FIG. 16.—A practical concrete watering tank, accessible from three lots

mainly upon the air temperature, the quantity of milk produced and of succulent feed in the ration. The quantity of water drunk in cold weather is about the same as in moderate weather, but is much less than in hot weather. If large quantities of such feeds as beets or mangels are fed, very little water is required.

In experiments at the Beltsville station cows were watered once, twice and at will from watering cups. Cows watered once a day drank less and produced less than when watered twice a day or at will. Cows watered twice a day drank as much but produced less than when watered at will. The cows used were average producers and the maximum difference found in production, between watering once a day and at will, was only about 5 per cent. The higher the production the greater the benefit to be derived from frequent watering. Some low-producing cows fed silage, hay, and grain refused to drink more than once a day in cold weather. With cows similar in production and receiving the same kind of feed, water consumption

was 80 per cent greater in hot summer than in cold winter weather. The demand for water was greatest after eating hay. In cold weather cows prefer water that has been warmed and will drink more of it, though experiments at several stations show that the amount of production is influenced but little by warming the drinking water.

#### SALT

Dairy cows should have all the salt they want. The quantity consumed will vary with the kind of feed and size of the animal. Experiments have shown that ordinary cows in milk will require about 1 ounce of salt a day. Heavy producers should get more. Many dairymen mix salt with the grain mixture, incorporating from 1 to 2 pounds of salt with each 100 pounds of concentrates. In addition, salt is provided so that the cows can have access to it and take

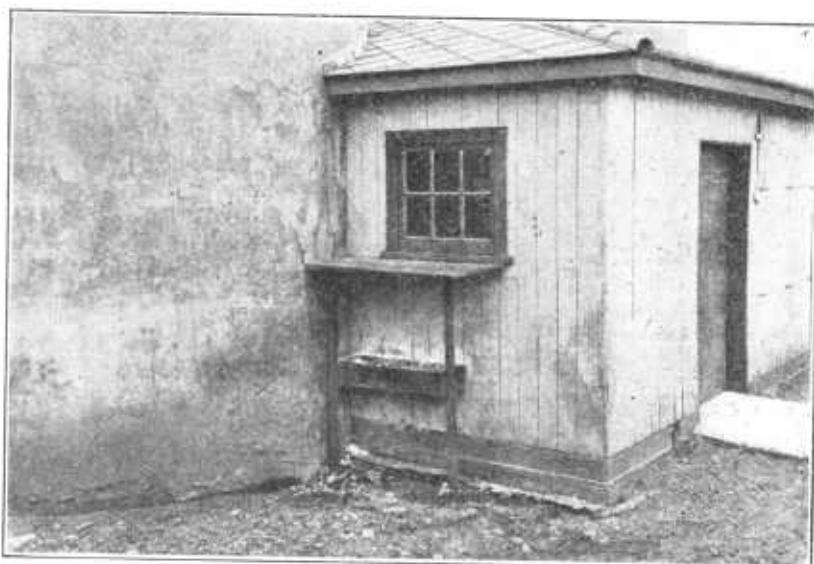


FIG. 17.—A conveniently arranged salt box.

more if they desire. Stock salt can be purchased in several forms. In cake form, salt may be kept in each feed box in the barn where the animal can lick it, or it may be placed in convenient places in the lot or pasture. It should be in some sheltered place, to prevent the rain from dissolving it. (See fig. 17.)

#### FITTING FOR SHOW

The showing of dairy cattle is very common and serves many useful purposes. It is a guide to more constructive breeding and helps to familiarize breeders with the better type of dairy cattle. Probably the most important reason for showing is the advertising that it brings. To exhibit widely is expensive and one should consider fully the benefits as compared with the cost and effort. However, the owner of a few cattle can exhibit at local shows and fairs

to advantage without much trouble and expense. The following suggestions are made for his guidance.

1. Fitting cows for show should begin a year before the exhibition, for only in that way can they be made to show most advantageously. The cows can then be selected and bred so as to calve a short time before the first showing. By this plan each cow is at her best, has a large udder, and has had a few weeks in which to recover from freshening.

2. With bulls and young heifers early preparation is unnecessary. When animals are to be shown in classes under 1 year of age, it is well to choose calves that were born just after the date used in figuring age (usually August 1 and February 1) so that they may have the greatest development. Large, growthy young animals always appear to better advantage in the show ring than smaller ones.

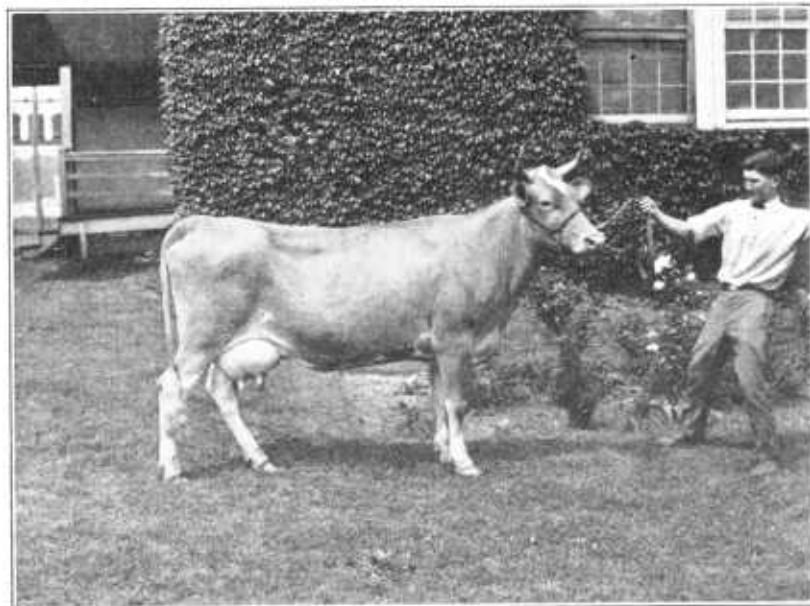


FIG. 18.—A well-fitted cow properly shown

3. Animals to be shown should be in good flesh, not fat, but smoothly covered over all parts. Thin animals in poor condition will be discriminated against in the ring. No particular system of feeding is necessary for dairy animals, but the feed should be somewhat laxative and should be fed in abundance. The teaching or training of animals to walk, stand, and act so as to appear to the best advantage, is a very essential part of fitting for show. They should be taught to walk in an alert, active manner, and, above all, they must be trained to stand erect for long periods without slouching. The training should be so thorough that practically nothing will excite the animals and make them hard to manage. (Fig. 18.)

4. For a month or two before the show the animals should be kept in the barn. After being thoroughly washed and scrubbed with soap and thoroughly rinsed, they should be blanketed with light burlap

blankets. From that time on the animals should not be allowed to remain out of doors in the sun without blankets, if their hides are to be kept mellow and soft. Clipping is an important operation, and there are many different methods. The extent of clipping depends upon the conformation of the animal and its quality of hide and hair. In any case, the face, ears, udder, milk veins, and tail should be clipped, the switch, of course, being left. Clipping gives an appearance of trimness and quality to the animal that is difficult to obtain in any other manner. (Fig. 19.) Clipping several weeks before the show allows the hair to grow out somewhat and makes

the coat look softer. Much time should be spent daily in brushing, first with a stiff, coarse brush, then with a lighter, softer one, and finally rubbing with a woolen cloth moistened with linseed oil. Such treatment will bring a gloss and softness even to the coarsest hair. If the hide is thick and tight or has a tendency to be coarse, occasional scrubbing with hot suds made from green soap, followed by a heavy blanketing and sweating, will aid greatly in producing a loose, pliable skin.

5. Hoofs must be trimmed so as to be symmetrical. (Fig. 20.) This can easily be done with a hoof

After trimming, the



FIG. 19.—Clipping gives an appearance of trimness and quality. Note blanket on heifer

knife, pincers, rasp, wood chisel, and mallet. The hoofs should be rasped smooth. Care should be exercised in all this work not to cut or rasp the hoofs too thin. If the hoof is so hard that a hoof knife can not be used, the animal may be placed on a wooden floor and the hoof trimmed by means of a chisel and mallet. The hoof should be oiled and rubbed to a gloss after final smoothing.<sup>7</sup>

6. If animals have horns, these should be scraped with a steel scraper or glass lengthwise until nearly smooth and then finished off with fine sandpaper or emery cloth. When as smooth as they can

<sup>7</sup> For directions and pictures on trimming hoofs and horns, see Farmers' Bulletin 1412, *Care and Management of Dairy Bulls*.

be made, the horns should be polished frequently before the show with powdered pumice stone and sweet oil. It is very common to make leather, chamois, or flannel horn coverings to protect the polished horns.<sup>7</sup>

7. The tail should be washed several times. The day before showing it can be bleached with blueing, if light in color, and then braided into three or four small braids and left overnight. When ready to show, open the braids and brush out the tail, thus giving it a clean, fluffy appearance.



FIG. 20.—Trimming the hoofs. Note also how hair on face and ears has been clipped, and horns polished.

#### DISEASES AND COMMON AILMENTS

##### TUBERCULOSIS

In most cases this infectious disease is of a chronic nature, taking a number of years to run its course, often with no visible symptoms. Consequently the more chronic its character the more dangerous as spreaders of the disease are animals affected with tuberculosis.

The disease may be introduced into a herd by bringing in diseased animals, by feeding calves milk from tuberculous cows (this may happen by using unpasteurized skim milk from a creamery), by showing cattle at fairs, by shipping cattle in infected cars, and by pasturing with other cattle that have the disease. The most reliable way to tell whether living cows have tuberculosis is to have them tuberculin tested by a competent veterinarian.

<sup>7</sup> For directions and pictures on trimming hoofs and horns, see Farmers' Bulletin 1412, *Care and Management of Dairy Bulls*.

Of all the plans tried out for the eradication of tuberculosis, the accredited-herd plan and the accredited-area plan offer the most promise and are accomplishing the best results.<sup>8</sup>

#### INFECTIOUS ABORTION

Infectious abortion is a disease very prevalent in dairy herds and causes excessive losses to dairymen each year.

The symptoms which denote its presence in a herd are rather indefinite and inconstant. The act of abortion is probably the symptom which is most widely known and readily observed, but may easily be misinterpreted, since not all cows which abort are affected with the infectious disease. Its prompt recognition in diseased herds is rendered difficult by the fact that many animals which acquire the disease may never abort.

Cows that abort as a result of the disease often retain their afterbirths.

It has been observed that barrenness is usually a troublesome factor in herds in which the disease has gained entrance. Often cows that have aborted conceive promptly, but it is not infrequently necessary to breed an aborter five or six times before conception takes place.

The presence of the disease in herds not only causes loss of calves but may seriously interfere with milk production as well.

At the present time no specific cure for infectious abortion is known. The proper course to pursue is dependent in a measure upon how extensively the disease has spread. The disposal of aborters may afford but slight relief, since their elimination from the herd usually means that only a portion of the affected animals have been removed.

Abortion losses in infected herds may be prevented to no small degree by appropriate sanitary measures, such as (1) isolation of aborting animals or those about to abort, as long as they continue to have uterine discharges; (2) disposal of fetuses, afterbirths, and bedding contaminated with uterine discharges in such a manner that they will be inaccessible to the rest of the herd; (3) precautions against tracking discharges about premises; and (4) liberal use of disinfectants about stables.

Maternity stalls should be provided for all cows in the herd at time of calving, in which they should be confined following calving as long as they have uterine discharges. The infected cow which produces a seemingly normal calf may be as great a source of danger to healthy stock at time of calving as though she had aborted.

Experimental studies have indicated that animals acquire the disease mainly through the mouth by consuming feed or water that has been contaminated with material from the generative organs of infected animals either at or near times of calving or aborting. It is at these times, therefore, that extreme precautions should be taken in so handling the animals that their discharges may be confined to as small an area as possible, where they may be gathered up and proper disposition made of them.<sup>9</sup>

<sup>8</sup> Detection, control, and eradication of this disease are discussed fully in Farmers' Bulletin 1069.

<sup>9</sup> Details of this disease and treatment can be obtained by writing to the Bureau of Animal Industry, United States Department of Agriculture, Washington, D. C.

**DIFFICULT CALVING**

Usually a cow will calve without assistance if kept quiet and not excited. Strangers, children, and particularly dogs, should be kept away from the cow. The stall or other place where the calf is to be born should be clean. Before labor has progressed to any great extent it is well to see that the presentation is normal; that is, that the front feet and nose are first to appear. Sometimes one or both feet or the head is doubled back. When this occurs, calving without assistance is difficult or impossible. The calf should be placed in proper position for it to be born, and this usually means pushing the calf back into the uterus, which is sometimes rather difficult to do. Unless a person is skilled in such work it is better to call a veterinarian. A bungled job may mean serious laceration of the uterus, a loss of the cow, or the death of the calf. Calves can also be born hind feet first. When this occurs, some one should be on hand to see that delivery is hastened at the critical moment; that is, when it has so progressed that the blood supply to the calf through the navel cord is shut off. The calf must then be able to start breathing or it will smother.

Sometimes assistance is needed, especially with the young cows, even when the presentation is normal. Hence the cow should be watched rather closely, but no help should be given unless it is necessary. Time must be allowed for the relaxation of the openings from the uterus and vagina. In general, labor should continue for two hours or more before any help is given, although the condition of the cow should be taken into consideration. She should not be allowed to become too much exhausted before help is given.

The way to help is to take hold of the calf's feet, if they protrude, otherwise pass cotton ropes around them, and pull hard every time the cow strains. Do not pull at any other time and do not be in a hurry about getting the calf. Too much haste or excessive pulling may injure both cow and calf.

As soon as the calf is born, the navel cord should be clipped about an inch from the belly, the few drops of blood squeezed out, and tincture of iodine or full-strength compound solution of cresol or other coal-tar preparation applied.

The afterbirth is usually passed in a few hours, but if not expelled naturally within two days it is thought best by most veterinarians to remove it by hand. This should not be attempted by an unskilled person, as care must be taken to avoid injury in disengaging the cotyledons which attach the afterbirth to the uterus, and special effort must be made to get all the afterbirth. It is also necessary to avoid introducing infection into the uterus by dirty hands or irrigating tube. The irrigating tube should be sterilized by boiling before and after use. Very mild antiseptic solutions, in large quantities, or salt solution (1 tablespoonful to a gallon of boiled water), are then used to flush out the uterus. If the cow does not expel all the liquid herself, it should be siphoned out. Flushing of the uterus should take place daily as long as a sterilized rubber tube can be inserted into the uterus. When the opening closes, so that a tube can not be inserted, the vagina should be flushed every day or so until all discharges cease.

**MILK FEVER**

This is a disease that generally attacks mature cows from the fourth to the sixth calf. High producers are more subject to it than low producers, and fat cows are more subject to it than thin cows. It nearly always occurs within two days after calving, and seems to be caused by an overfed condition of the animal. Plenty of water and salt and a minimum quantity of concentrated feed for several days before and after calving will help to prevent this disease.

The disease may be recognized by a staggering gait and lack of control of the hind legs. As the disease progresses the cow goes down in a stupor, lying in a normal position, except that her head is usually turned to her flank. Later, paralysis may become general and then the cow lies on her side.

The treatment consists of inflating each quarter of the udder with air filtered through a liquid or cotton. Almost any sort of air pump will serve to force the air into the udder. Satisfactory milk-fever outfits are on the market, or can be made up at little expense, using a bicycle pump, rubber tubing, a piece of large glass tubing in which to place the cotton, and a milk tube. Care must be exercised to have the milk tube sterile and the ends of the teats should be cleansed with a disinfecting solution. After inflation the teats should be tied with tape in order to prevent escape of the air. Ordinarily one inflation is sufficient, but in case the cow shows no improvement in two hours the inflation should be repeated. Every dairyman should keep a milk-fever outfit on hand for quick use.

**GARGET**

"Garget," "mastitis," and "mammitis" are terms which denote inflammation of the udder. One or more quarters may become swollen, hard, hot, and tender. The milk is reduced in quantity and may be of watery consistency or contain clots or strings of curd. In severe cases the contents of the udder may become foul-smelling. Cows with large udders are more susceptible than those with small udders. Some of the conditions which seem to cause or at least predispose the animal to garget are (1) exposure to drafts or cold weather, (2) bruises of the udder, (3) injuries to the teats, (4) the use of a milk tube, and (5) excessive feeding on rich feeds. Sometimes garget seems to develop without any apparent cause. Very often a sore on the end of the teat will lead to udder infection and garget.

Treatment consists of giving a dose of Epsom salt or other purgative, and putting hot applications on the affected parts several times a day for a least 30 minutes at a time. The Epsom salt should be given as a drench. (Page 32.) After these applications the udder should be wiped dry, and camphorated oil applied and rubbed in thoroughly.<sup>10</sup>

**COWPOX**

This is an infectious disease which causes characteristic sores on the udder and teats. Tenderness and redness of the teats are

<sup>10</sup> See Farmers' Bulletin 1422, Udder Diseases of Dairy Cows.

first noticed, which is followed by eruption of grayish-red nodules. A vesicle or blister forms in the center of the nodule in about 10 days and in another 3 days the blister breaks, discharges a yellowish serum, and then a scab forms.

Treatment consists of healing the sores left by the blisters. Zinc ointment is a very good remedy, acting not only as a disinfectant but also keeping the affected parts soft, thus preventing cracking and bleeding. Since this disease is commonly carried from one cow to another by the milkers, the affected animal or animals should be milked last; and, as a further safeguard, the hands should be disinfected after milking each cow in the herd.<sup>11</sup>

#### FOUL FOOT

This trouble is experienced in many herds. It is thought to be most frequently caused by infection from stable filth while standing in wet, dirty places, or from foreign matter becoming wedged between the claws. The hind feet are most likely to be affected. The animal seems to suffer when walking on the sore foot, and the region of the foot is inflamed and swollen. When the soreness has advanced, there may be sloughing off of the membrane between the claws, which has an offensive odor. The foot should be thoroughly cleaned, and if only slightly inflamed can be washed in a solution of carbolic acid, 1 part of pure acid to 20 parts of water. Cresol compound (liquor cresolis compositus U. S. P.), undiluted, is also good. The animal should be kept in a clean, dry place. In persistent or aggravated cases, the foot should be washed well with the solution and a wad of absorbent cotton smeared with pine tar placed in the cleft. This can be held in place by taking a strip of strong cloth, 2 inches wide, passing the middle between the claws, and then tying the ends after winding them above the hoof. The corner of a grain sack with strips left attached for tying makes a good outside bandage.

#### CHOKE

Choking is usually caused by a cow trying to swallow too large an object, like an apple, potato, or turnip. It may occasionally result from the collecting of soft feed into a ball. It is most likely to occur in cows that are greedy feeders.

The animal stops eating, coughs, and saliva runs from the mouth. When attempting to drink, water runs from the mouth. If the choke is high in the throat it may be felt as a lump on the left side of the neck. When the cause of the choke can be located in the throat it may be forced up into the mouth or crushed by pressing with the hand. A pint of raw linseed oil or olive oil will aid by acting as a lubricant. In severe cases a competent veterinarian should be called.

#### BLOAT

Bloat may be caused by any kind of feed which produces indigestion and forms gas in the paunch. It can be caused by pasturing on

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<sup>11</sup> See Farmers' Bulletin 1422, Udder Diseases of Dairy Cows.

young clover or alfalfa, especially with the dew on, or by feeding spoiled silage, roots, etc. The paunch is inflated most noticeably on the left side. In severe cases this distention may extend above the back. When tapped with the fingers the paunch gives a drum-like sound. When bloat is pronounced, difficulty in breathing is noticed.

Exercise the animal by walking. If this does not help, give 2 tablespoonfuls of liquor cresolis compositus (U. S. P.), mixed with 2 quarts of warm water as a drench. After bloating has subsided, give 1 pound of Epsom salt in 3 pints of warm water as a drench. If these remedies are not effective, and in urgent cases where the gas must be allowed to escape without delay, it may be necessary to puncture the paunch. This is best done with a trocar and canula. The trocar is a sharp-pointed instrument which fits smoothly into a hollow tube called the canula, leaving the sharp point exposed. After inserting the trocar and canula, by a quick, firm thrust inward, downward, and forward, the trocar is pulled out and the canula left in the opening. This will allow the gas to escape. The paunch is punctured on the left side with the trocar at the center of a triangle formed by the last rib, the hip bone, and the loin.

The animal should be fed sparingly on easily digested feed for several days after bloating has stopped, so that all fermenting material may pass out of the stomach.

#### DRENCHING

Medicine is usually given to cattle by "drenching." This is commonly done by mixing the medicine with water and giving this by the aid of a long-necked bottle or drenching horn through the mouth. The medicine should be given slowly, to prevent choking. A simple drenching tube can be made by using an ordinary tin funnel with a piece of rubber hose.

Care must be used in drenching to prevent the medicine from passing down the animal's windpipe to the lungs, causing pneumonia. In giving a drench the head of the animal should be held in an elevated position. The mouth of the bottle is inserted at the side of the mouth in front of the jaw teeth and on top of the tongue. If the animal coughs, the head should be immediately lowered, to prevent the liquid from passing to the lungs. Care should also be taken in holding the animal, to avoid stopping breathing through the nose. Unless one has had considerable experience in this practice it is best to call a veterinarian, especially if other than ordinary medicines are to be given.

#### NAILS OR WIRE IN THE STOMACH

On farms where much baled hay or mill feed is used many cows are killed as a result of sharp-pointed wires or nails puncturing the wall of the stomach, piercing the heart, or setting up infection. There is one compartment of the stomach in which such material is collected and held. Most of it usually does no harm, but occasionally a sharp-pointed object reaches a vital organ with fatal results.

Some farms have provided magnets over which all ground feed is passed. Pliers are used for cutting the wire on the baled hay instead of a hatchet or ax. Since the pliers sever the wire at one cut there is less danger of short pieces of wire being broken off and mixed

with the hay. If the hatchet always severed the wire at the first stroke it would be as good an instrument as any for cutting the wire, but usually more than one stroke is used.

When a cow is suffering from a nail or wire coming in contact with the heart, breathing becomes short and is accompanied usually by a gentle grunt at each respiration. The appetite and general health are also affected, and in severe cases the brisket may become swollen. The trouble is usually first noticed by general depression and refusal of feed.

Operations to remove the foreign objects have been successfully performed by skilled veterinarians. The usual treatment consists in keeping the cow as quiet as possible and avoiding the feeding of excessive quantities of roughage. Violent exercise or a greatly distended paunch may push the wire into the heart and cause death.

#### WARBLES

Warbles or grubs are the larval stage of the heel fly. The larva is about one-half to 1 inch in length and is whitish or brown in color. The grubs weaken cattle, causing them to fall off in flesh and milk, and also lower the value of the hide because of the holes they make in it.

Application of fly repellents during the summer is probably of little value in keeping off warble flies. When the grubs appear they cause lumps beneath the skin of the back. They should be forced out by pressure beneath the lump, or may be killed by forcing a little ointment, consisting of 1 part of iodoform to 5 parts of vaseline, into the opening of the lump. The former method is preferable, because it does not leave the dead grub beneath the skin.

#### LICE

The effects of lice are usually first noticed by patches of hair falling out around the tail-head or the withers. Careful examination will reveal the presence of lice. Unless the lice are killed, the animal will become thin and lose much of its hair. Young calves are especially affected. Lice are easily destroyed by a solution of standard coal-tar creosote stock dips. The strength of the solution as indicated on the container may be followed with safety. The dipping vat is the most effective means of applying the solution, but is not recommended to be used in cold weather. Lice can be destroyed on valuable or high-producing cows by hand treatment, without resorting to the dipping vat. It is no great job to go over the herd with a brush and disinfecting solution. A warm day should be selected for the work. A compressed-air or other type of sprayer can be used successfully in applying the solution.

#### FLIES

Flies are one of the greatest nuisances around a dairy; house flies because they contaminate the milk, and stable flies because they torment the cattle. Both are objectionable in that they soil the walls and equipment. House flies are not provided with biting mouth parts, but they may annoy cattle by feeding on eye and other body secretions. Their food is milk, soiled feed, etc. Stable flies

have piercing mouth parts; their food is blood, and for this reason they are not attracted by milk. These two kinds of flies look much alike. In addition to these, there are the small black horn flies, which are especially bothersome on account of their great numbers.

Flies breed in filth or decomposing matter of various kinds, horse manure appearing to be the most favorable material for house flies, wet and rotting straw or other vegetation for stable flies, and cow manure for horn flies. Cleaning up, treating, or screening their breeding places is an effective method of combating flies. This is especially true if a large area is covered, such as a whole community. The individual farmer can do much to lessen the number of flies on his own farm, as the major part of them, under usual farm conditions, are produced there. Since flies will travel for miles, however, the effectiveness of this method depends to some extent on the distance from other favorable breeding places.

One of the most effective methods of decreasing the trouble from house flies is to keep all food away from them. See that there is no spilled milk for them to feed on; also that all soiled mangers that attract flies are cleaned. If there is nothing for a house fly to eat it will not stay around. Fly traps will catch a great number if properly baited. They will also attract flies into the barn, and for this reason it is better to set the traps outside rather than inside the buildings. Poison made by using a solution of formalin and milk in the proportion of 3 teaspoonfuls of commercial 40 per cent formalin to 1 pint of sweetened milk gives good results. In using this poison, blotting paper may be placed in the bottom of shallow pans and the paper barely covered with liquid. As the liquid dries out it should be renewed.

Since stable flies are not attracted by bait of any kind, the method of combating them is to keep them away from the stock by darkening the stable, blanketing the cattle, or using some sort of fly repellent on the animals. No repellent has yet been devised that will protect the animals for more than a few hours. A repellent composed of the following is probably as effective as any: Oil of tar, 10 parts; cottonseed oil, 10 parts; and paraffin oil, 80 parts. Although flies worry cows considerably, the presence of limited numbers does not materially affect milk production.<sup>12</sup>

#### WARTS ON THE TEATS

Sometimes warts attain sufficient size to interfere with milking. One method of removing them is to apply castor oil or pure olive oil after each milking for a week. If this treatment fails, the warts can be touched with a stick of lunar caustic and the oil applied after that. Long warts that are not too large at the base may be removed by tying a silk thread tightly around the wart near the teat and allowing it to remain until the wart drops off.

#### CRACKED TEATS

Sometimes a cow's teats will chap in the winter. The cause is exposure to cold when the teats are still moist. The remedy is to milk with dry hands and to see that the teats are dry when the

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<sup>12</sup> The following Farmers' Bulletins give more detailed information: No. 734, Fly Traps and Their Operation; No. 1097, The Stable Fly; No. 1408, The House Fly.

cows are turned out in the cold. Wet milking and the sucking of calves make the teats more liable to chap. In case cracking occurs, the main treatment consists in keeping the teats soft with applications of oil or salve. This will help to protect the teats from excessive drying and continued cracking.<sup>13</sup>

#### KICKING

Kicking during milking is largely due to poor management. Many cows will kick when they are being broken to milk, and they must be carefully handled so that they will not form the habit. Sore or cracked teats will also cause cows to kick. One should never strike a cow for kicking. Such practice will get her excited and make her worse. Some animals must be restrained while being milked. This is best accomplished by placing a heavy strap or rope around the rear legs just above the hocks. Pass this strap around one leg, cross between the legs, and then around the other, drawing them close together. Unless crossed in the middle the strap will slip down when the cow struggles.

#### SELF-SUCKING

Every dairyman has had experience with cows that suck themselves. There seems to be no satisfactory explanation as to why they do this. To prevent the habit many devices and methods have been tried with varying degrees of success. One device may work successfully on one cow and fail on another. One method that has been used successfully is to fasten one end of a strong stick about 3 feet long to the ring of the halter, passing the stick between the front legs and fastening the other end to a ring in a strap that extends around the cow's body. This device allows the cow to raise and lower her head but prevents turning her head toward the body. Muzzles placed over the animals' noses, cradles around their necks, bits in the mouth, and various other methods have been used. Applications such as quinine or red pepper have been placed on the teats. If a cow is a confirmed self-sucker, she should be sent to the butcher unless she is especially valuable as a breeding animal.<sup>14</sup>

#### DEHORNING

Horns are of no use to the animal. It is no longer necessary for the cow to fight for self-protection or for the protection of her young. Cows with horns oftentimes injure one another in the stable or lot, and they sometimes accidentally injure the attendants. Bulls with horns are decidedly more dangerous than those without horns. There is only one excuse for allowing animals to retain horns, and that is for the sake of appearances; and it is very questionable whether a large proportion of horns as found really add to an animal's appearance. Still they do sometimes increase the selling price of an animal and may increase its chances in the show ring, and so long as these conditions exist it is advisable to let the horns remain on at least some of the purebred animals.

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<sup>13</sup> See Farmers' Bulletin 1422, Udder Diseases of Dairy Cows.

The main thing to consider in dehorning or in prevention of horn growth is to destroy or remove the skin from which the horn grows. In the calf this skin covers the horn button and can be destroyed by treatment with caustic soda or potash. In a few weeks thereafter this skin lies at the base of the horn and entirely surrounds it. Proper dehorning therefore includes the removal of this skin, which is accomplished by sawing or clipping the horns close to the head. Unless this skin is removed the horns will grow again and produce what are known as scurs.

The substance usually applied after removal of the horns is pine tar. This helps to keep away flies and probably assists in checking the bleeding. If bleeding persists, it can be stopped by passing a string around the horn stubs and twisting tightly over the poll. This string should be removed as soon as danger of bleeding ceases, or in about 12 hours. To avoid any trouble from flies it is best to dehorn during the late fall, winter, or early spring. Experiments indicate that the milk flow of dairy cows is not seriously affected by dehorning.<sup>14</sup>

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<sup>14</sup> Full details on dehorning may be obtained from Farmers' Bulletin 949, Dehorning and Castrating Cattle.

## ORGANIZATION OF THE UNITED STATES DEPARTMENT OF AGRICULTURE

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37